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Gerontological Intellectual Development Features of Older Adults

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Annotation: This article examined the opinions and experience of different scientists. Intellectual development features elderly people in gerontology was analyzed by scientists. These studies of age changes in cognitive functions of each researcher were considered and analyzed.

Key words: aging, gerontology, psycholinguistic research, development.

Introduction. With the development of cognitive psychology, research in the field of mental functions of the elderly has become more attractive to scientists. As many authors point out, the relevance of intellectual research in old age is primarily due to the fact that it is intellectual activity that acts as one of t he factors inhibiting the growth rate of age changes of the psyche at the later stages of ontogenesis [Cold, Mankovsky 2003:172]. There is currently a slowdown in aging processes, especially in the field of intelligence and the personality of modern people, so data on the decline in intelligence in older persons are criticized. However, there is little doubt that there are significant individual differences in cognitive development rates concerning both general ability and more specialized abilities. The intelligence of the old we can determine how to cope with a wide range of familiar tasks based on rich life experience.

Material and Method. Scientific literature and opinion of scientists around the world were the research materials of this article. In the future, it is planned to conduct an experiment of free associative experiment, where elderly people will participate. The experiment will involve 200 test subjects (100 men and 100 women), the age range of which is from 60 to 90 years. The study will also use the results of associative experiments conducted by other authors with tested different age groups. Descriptive comparative method, observation, quantitative analysis were used as methods of research.

Discussion. According to E.F. Rybalko, the central mechanism of conscious regulation is a speech whose importance increases during the period of gerontology. Throughout the previous life, the speech includes a huge number of associative connections with external and internal irritants. Acting on the principle of distraction and generalization, the speech is characterized by a qualitatively different level of integration and regulation of behavior. A number of studies of the second signal system show weakening with age of internal braking, development of inertia of irritating process in speech analyzer, weakening of differential braking. This was expressed in the prolongation of latent period of verbal reactions in conditions of associative experiment, in repeatability of responses, echolalia, polytheism. Such symptoms are mainly observed in persons over 60 years of age [Fishman 1990:239].

B.G. Ananyev also played a huge role in speech factor contributing to the preservation of human beings in old age. He wrote that "speech, second-signal functions confront the general aging process and undergo evolutionary shifts significantly later than all other psychophysiological functions" [Ananaev 1980:111].

Anastazi, an American expert in intelligence testing, concludes that age-related intelligence declines only after 60 years [Anastazi 1982]. The results of experimental studies show a close connection of intellectual productivity of people aged 60-80 with education and profession [Alexandrov 1974]. Professional orientation determines the age dynamics of intelligence. The nature of professional activity associated with a wide range of intellectual operations contributes to the high preservation of both verbal and nonverbal intelligence. Tasks related to the use of nonverbal intelligence (picture storytelling tests, drawing from parts) reveal the most noticeable decline with age. Verbal tests (dictionary, information, and general awareness) reveal the greatest variability and tendency to decline with age. According to M.A. Cold, "in the later stages of ontogenesis, those verbal cognitive functions that are related to the stock of knowledge, the ability to categorize and understand the meanings of words remain without any significant changes." 2003:174].

Cattell R.B. and J. Cattell R. Hom J.L. distinguished two types of specific abilities, calling them "crystallized" and "moving" intelligence. Crystallized intelligence estimates the amount of knowledge a person acquires during his or her lifetime. Mobile intelligence tests rely on acquired knowledge to a lesser extent and assess what can be determined as the ability to solve problems that cannot be derived from education or practice. In other words, it is a person's ability to solve unusual problems [Hom, Cattell 1967].

These studies of age changes in cognitive functions show that "crystallized" functions (logical thinking, ability to account, etc.) depend heavily on the aging process, their structure does not change, they can train. As for speed capabilities ("fluid intelligence") they decrease as they age, especially after 60 years. Spatial intelligence remains unchanged also until about 60 years, after which there is a decrease in productivity [Druzhinin 2000:106-107]. A long-term study conducted in Seattle by K.W. Shay found stable sexual differences that lie in the advantages of women's understanding of words and inductive thinking and men's spatial orientation and accounting. For women, deterioration occurs earlier in fluid abilities, while for men - in crystallized abilities. And although fluid capacities begin to weaken earlier, crystallized ones decrease sharply, which happens by the end of 70 years of age [Shay 2004:376]. Whatever the exact figures, it is important that the decline in mobile intelligence is not inevitable for all people.

According to his research, about 10-15% of the elderly maintain their youthful level of intelligence [Rabbit 1984:101]. Subsequent studies by P. Rabit demonstrated that the variability in the test results for the elderly is greater than for young people by many cognitive criteria, such as reaction time, and by memory measurement criteria [Rabbit 1993: 385]. It is well known that the reaction time increases as a person ages. According to the review by D. Biren and L. Fisher, this is one of the most reliable characteristics of human age [Birren & Fisher 1995].

Many cognitive problems of older people are associated with significant intellectual defects, especially in memory. Characterizing data on memory examination, B.A. Grekov notes: 1. People between the ages of 70 and 90 experience memory impairment, but this deterioration is uneven. Especially mechanical imprinting. Motor memory is not so noticeable. 2. It is best to preserve the meaning component of logical-

meaning memory between the ages of 70 and 89 years. 3. Image-sensitive memory weakens more than meaningful memory components, but still it is better preserved than mechanical printing. 4. The basis of memory strength between the ages of 70 and 89 is internal meaningful connections. 5. At a certain age, more often by 90 years, the internal meaning relationship is also significantly weakened. Memory of any kind becomes unstable, everything new is perceived badly. The structure of the perceived material is violated. 6. Deformation is particularly strong in image memory where perception and memory are not accompanied by the organizational influence of speech. 7. The leading form of memory in old age becomes meaningful, logical memory [Greek 1964:176].

As N.V. Zotkin points out, in old age there is a 20-40% decrease in memory on average, but it is not observed in all old people. In particular, arbitrary memory of disconnected material (mechanical memory) suffers greatly, while logical and meaningful memory is well preserved up to 70-80 years [Zotkin 2003:378]. Many authors acknowledge that active elderly people retain all forms of memory longer. Analysis of psychological literature suggests that memory impairment in old age is ambiguous. Along with a small age decrease in short-term memory, there are significant changes in long-term memory associated with deteriorating information processing. Young and elderly people may have equally effective short-term memory. The difference is that older people have weaker coding or decoding mechanisms [Stuart Hamilton 2002:83]. M. Perlmutter and K. Mitchell agree with this view, pointing out that older people have particular problems with information encoding, and also note that aging affects the decoding and storage processes [Perlmutter and Mitchell 1982]. In older people, coding processes are slower and less efficient. If they are not intentionally motivated, they choose less effective methods of encoding and decoding information [Also]. K. Orlock points out that as one ages, one's memory deteriorates, i.e. it takes a little more time for the elderly to recreate the facts, numbers, names. The results of the experiments showed that in appropriate training and in old age one can have a good memory [Orlock 2004:218-220]. It should be noted that older people perform tasks better if the task has an obvious practical deviation than is purely abstract. If it is necessary to perform the task of understanding the proposal, older participants put more emphasis on understanding than on memorization [Stuart Hamilton 2002: 84]. In his work, L. Hasher and R. Zacks argue that automatic processes are virtually unaffected by aging. At the same time, the level of verbal cognitive functions that require as their cognitive provision of advanced RAM and ability to concentrate is clearly decreasing with age.

The Slivinski 1997 study notes that cognitive deceleration is probably not indicative when calculating speed in tasks of different complexity. Perhaps different tasks are related to the actions of different mechanisms. Thus, it can be argued that changes in cognitive and verbal memory during aging are strongly related to mobile intelligence [Salthouse 1991], processing speed, and less strongly to other functional indicators such as visual acuity [Salthouse et.al., 1996].

M.A. Coldi argues that intellectual well-being at the later stages of ontogenesis is ensured through the work of mechanisms of conceptual thinking, which seem to compensate for the decrease in efficiency of mechanisms providing spatial transformation and operational forms of information processing [Cold, Mankovsky 2003:175]. The impact of aging on human linguistic processes is rarely seen in books on general gerontology. The study of linguistic changes in the elderly is currently fragmentary. Some areas are studied quite deeply, while others are only slightly

affected. Nevertheless, it has been found that impaired vision and hearing, which is inevitable in old age, has a significant impact on linguistic processes. It is common knowledge that changes in the sensor system can affect the efficiency of information processing. For example, P. Rabith noted that elderly people with a slight hearing impairment experienced difficulty with hearing words. Obviously, even with weakened hearing, older people can perceive the word, but it requires a lot of effort, leaving less mental resources to encode and then store words. However, if the participants are presented with printed word lists, there is no significant difference from the norm (i.e. influence is limited to the situation where the hearing is part of the processing chain [Rabbit 1989:167].

In his work with the elderly, P. Alen varied the complexity of words used in the task of vocabulary choice, focusing on the relative peripheral (such as the change in the ease with which stimuli can be coded) and the relative central (such as the frequency of words) aspects of mental processing. The researcher concluded that age differences usually occur in peripheral rather than central mental processes (e.g. in word frequency tests, no age changes were identified) [Allen 1993:274-282]. We can agree that to date semantic and syntactic processing in older people is not sufficient. There are considerable differences of opinion on these issues. I. Kozora and Cullum 1995 found that creating examples for individual semantic categories was less effective for older people. A decrease in semantic memory was also recorded in C. Camp's work [Camp, 1988].

D. Kinet and S. Kemper noted that the variety in constructing syntactic structures decreases with age, and the number of errors such as the use of incorrectly constructed sentences increases [Kynette and Kemper 1986:65-72]. S. Kemper [Kemper 1986] proposed to the elderly and young experienced phrases, on the basis of which it was necessary to create new ones with the same syntax structure. She found that older participants could' accurately repeat only short sentences. Long sentences, especially with complex connection, caused difficulties. This change in grammatical construction is also reflected in everyday conversation. This can be explained by the fact that older people know that their working memory no longer has the same amount of memory as it was in youth, so the proposals are simplified and shortened to compensate for this shortcoming. The second explanation may be that changing the amount of memory and grammatical design is a manifestation of a general intellectual change. With age, abilities are used less and this eventually leads to their decline. Older people give fewer very quick answers. But richer experience compensates for the decline in abilities. Evidence of possible decline in cognitive abilities in old age cannot yet be considered final. Many older people manage to maintain the normal level of cognitive abilities that they demonstrate during adulthood. The active-transforming attitude of the individual helps him partially compensate for the diminishing intellectual opportunities. Individuals engaged in creative work are mobilizing various functions, including them in the general structure of intelligence as a holistic education, which is consistently opposed to the aging process [Fishball 1990: 247].

The data confirm the heterochronicity of intellectual development in ontogenesis, demonstrating the existence of organic unity of the evolutionary and evolutionary changes in the character of intellectual activity in the aging process and, on the other hand, the formation of powerful compensatory mechanisms, providing the necessary adaptive effects when re-engineering the intelligence. Traditional intellectual theories did not cover, but often simply ignored the features of devices and functions of intellect in old age (the phenomenon of "wisdom") [Cold, Mankovsky 2003:176]. In the modern

stage of cognitive process research in old age, they went beyond traditional psychometric tests of intelligence, covering new experimental and theoretical paradigms, including cognitive psychology and neuroscience. All this time, scientists successfully studied only the intelligence, the success of intellectual activities in those or other specific situations in terms of accuracy and speed processing information in the decisions, originality and diversity of ideas, the depth and pace обучаемости, выраженности personalized ways. With the development of cognitive sciences, this approach to the problem of intellectual abilities and intelligence as a whole is losing its importance. At the moment, a completely different view of the problem of intelligence is becoming urgent. Referring to some of the features (events) of intelligence in old age, we support M.A. Cold's view that "it is impossible to explain the nature of intelligence at the level of analysis of its properties (events) in principle. To do this, we need to move on to the analysis of the features of the internal structure of this mental education, which predetermines its final (systemic) properties [Cold 2002:79].

In the theory of M.A. Cold key concepts in determining intelligence are mental structures, mental space and mental representations. Mental structures are "similar mental mechanisms in which the object's cash intellectual resources are represented and which, when faced with any external impact, can "deploy a "specially organized mental space". Under mental space, the author implies "a dynamic form of mental experience that is updated in the context of cognitive interaction of the subject with the world". As for mental representation, it represents the "current mental image of a particular event" [Cold 2002:106-109]. Individual differences in the success of psychological tasks explain the peculiarities of mental structures that provide cognitive processes.

Conclusion. When considering the relationship between meaning and intellectual capabilities of a person, the triarchic theory of intelligence by R. Sternberg is of great interest, which gives a comprehensive explanation of the relationship between the intellect and the inner world of an individual, intellect and experience, intellect and the outside world. The author suggests that the process of information processing takes place with the participation of three main types of components: meta-components, executive components and knowledge acquisition components. The direct relation to the problem is that when controlling the selection of lower-level processes to solve a particular problem, the meta-components guide the selection of some strategy and mental representation on which this strategy can act. Based on his experimental data, R. Sternberg concludes that the test subjects tend to prefer some strategies to others, because they require less workload on the working memory, and the choice of mental representation of information is closely related to the strategy adopted. People show flexibility in ways of representation; depending on the age of the experienced mental representations may be more or less holistic. The main question the researcher sees is not how some information is represented, but what representations are used under certain conditions. The test subjects operate with semantic features that potentially relate to solving the problem. R. Sternberg notes that people who are able to apply knowledge components to different situations usually have a more developed vocabulary [Sternberg 1966]. Since the problem of semantic development in old age is at the center of our interests, it seems important to cover some issues related to the consideration of mental representations, namely

semantic representations or semantic systems at the later stages of human development.

Acknowledgement. Various types of changes in old age are ultimately aimed at updating and utilizing the potential, reserve capabilities accumulated during growth and emerging during late ontogenesis. Conservation of meaningful and logical memory in a sufficiently good condition allows elderly people to establish semantic-relevant relationships between stimulus and response. In old age, the ability to establish logical-meaning relationships gradually loses, leading to the production of "weak" surface associations. In any case, and in late adulthood, we can talk about semantic development. The use of the word "development" implies a change both in the direction of evolution and in the direction of evolution. The gradual, inevitable extinguishment of some functions is supported by others - the long-standing preserved; these processes, including semantics, ensure the activity and vitality of the old man. Thus, aging cannot be seen as a simple invasion, extinction, or regression. This is an ongoing development involving many adaptation and compensation mechanisms.

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